

Physics I.5

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Chapter 5 has three main parts: 188a19-30 picks up on part of what was said in chapter 4—that Aristotle’s predecessors in one way or another made opposites principles; 188a30-b26 considers the idea that opposites are principles ἐπὶ τοῦ λόγου; 188b26-189a10 returns to the subject of Aristotle’s predecessors. It is important to bear in mind that ch. 4 did not ascribe to these predecessors the view that opposites are the *only* principles (see 187a12-26). As we shall see, this will be especially relevant to the argument at 188a25-30, to the whole of the argument ἐπὶ τοῦ λόγου, and to the three statements of the conclusion which Aristotle appears to have reached—188b25-6, 188b28-30, and the concluding sentence of ch. 5 (189a9-10), ‘that the principles must be opposites is evident.’ Most of the key issues in I.5 concern either the chapter as a whole or the relations of some of its parts, and so I shall organise my paper around these rather than by proceeding line by line. The issues are: (1) how we should understand, and best translate, ἐναντίον; (2) how we should understand Aristotle’s various claims about principles (ἀρχαί); (3) the tension between the claims that ἐναντία are not from each other and yet come to be from each other; (4) questions about the logical grammar and/or the ontological commitments of these claims, about what the principles in question are principles of, and about Aristotle’s insistence that these principles are *opposites*; (5) the assessment of Aristotle’s position in ch. 5. I conclude with (6) a commentary on the final part of the chapter, 188b26-189a10.

1. How should we understand and translate ἐναντίον?

I shall discuss two questions: is Aristotle using ἐναντίον in a technical sense, and how should we best translate the term? Even if we suppose the answer to the first question is yes (I cast some doubt on this below), I prefer the translation ‘opposite’ to ‘contrary’. The modern notion of being contraries is a purely logical or formal one, defined in terms of (in)compatibility relations;¹ this notion stems from Aristotle’s treatment of contrary statements in the *De Interpretatione*.² Aristotle gives set-piece accounts of his technical notion of ἐναντία in *Cat.* 10 and in *Metaph.* I.4-

10: it is perhaps unclear whether these two accounts yield the same sense or different ones.³ But in either case Aristotle's notion of ἐναντία is not primarily about statements or their truth makers. It is clear from his discussion in *Cat.* 10 that as applied to properties or to terms it not a purely formal one.⁴ Thus he distinguishes ἐναντία from ἕξις and privations on the grounds (i) that a privation cannot precede a ἕξις and (ii) that the acquisition of a privation is irreversible (so that privations acquired after the ἕξις has been possessed cannot be lost), whereas change into an ἐναντίον is reversible; (iii) in the course of this he classifies essential properties which are the same as 'contingent' ἐναντία (such as fire's being hot) as themselves ἐναντία rather than as ἕξις and privations, despite their inability to be lost (12b26-13a36). These are causal grounds, not grounds relating to formal (in)compatibility. Similarly, in *Metaph.* X.4 Aristotle distinguishes ἐναντία from contradictories on the grounds that the former but not the latter 'admit of intermediates' (1055a38-b3): given that not all ἐναντία do admit of intermediates,⁵ Aristotle is clearly thinking of them as a *kind* defined independently of their (in)compatibility relations—and that is exactly how he proceeds in *Metaph.* X, where he defines ἐναντία in terms of maximum or complete difference within a genus.⁶ Finally, there is the idea advanced in *Metaph.* X.4 that intermediates are *composed of* ἐναντία.⁷ For these reasons I prefer to avoid the translation 'contrary' even for Aristotle's technical usage(s), and use 'opposite' instead.⁸

Is Aristotle using ἐναντίον in a technical sense? In truth, I think that this is indeterminate. On the one hand, Aristotle is using the term to characterise the position of the Presocratics, who seem not to have used the term ἐναντίον in this sort of context at all,⁹ and in any case certainly lacked Aristotle's technical usage. The opposites taken to be fundamental by one early physicist or another are, as Aristotle says, pairs such as hot/cold, wet/dry, dense/rare, full/empty; typically—though not in the case of full/empty—these are thought of as mutually-excluding extremes on some scale or spectrum, and as in some way involving opposed causal powers:¹⁰ this idea is not unrelated to Aristotle's technical usage, but it is hardly identical to it. On the other hand, it is of course common Aristotelian practice to characterise his predecessors' views in his own terms and thus to align their approaches and conclusions more closely with his own—or to oppose them more sharply—than might be historically warranted. There is some reason to doubt that Aristotle's usage of ἐναντίον is his technical one, however. As is well known, he is going to go on to claim that ἐναντία are principles because form and formlessness—or, more generally, form and privation—are principles. It is a familiar problem that form and privation are ill-suited to be ἐναντία,¹¹ and indeed that in *Cat.* 10, as we have seen, Aristotle distinguishes ἕξις and

privation as a different species of ἀντικείμενον from ἐναντία.¹² What is most striking in our chapter is perhaps not so much Aristotle's doctrine as his terminology. After expounding the claim that (sc. in the case of incomposites (ἀπλᾶ)) all changes are between ἐναντία, he says at 188b8ff. that the same is true for composites (σύνθετα):

And this holds in the same way in the other cases, since the same account holds also for those of the things that are which are not simple but composite; but this is overlooked because the opposed conditions [τὰς ἀντικειμένας διαθέσεις] have not been named. For it is necessary for everything structured to come to be from unstructured and the unstructured from structured, and for the structured to cease to be into unstructuredness—and this is not just any unstructuredness but the opposed one [τὴν ἀντικειμένην].

The switch to ἀντικειμένας might seem to betray some recognition of the point that structured and unstructured are not ἐναντία—yet Aristotle draws his conclusion about ἀρχαί once again in terms of ἐναντία at b25-6.¹³ This is not the language of someone keeping a careful eye on the technical distinctions of *Cat.* 10 or *Metaph.* X. I shall return to this issue at the end of section 4.

It is worth noting the remark at a26-7: 'that everyone in a way makes the principles opposites, therefore, is clear.' Both Simplicius and Philoponus take the πῶς ('in a way') to qualify 'opposites', and hence, they think, to reflect Aristotle's recognition that full/empty, angular/unangular, straight/curved are not contraries but ἕξεις and privations;¹⁴ Simplicius links this with Aristotle's own appeal to form and privation in his positive account. I do not see why these pairs, suitably understood, should not count as complete differences within a genus; but in any case I think it more natural to take πῶς to qualify ποιούσι, and as thus making the whole assertion slightly guarded.

2. How should we understand Aristotle's various claims about ἀρχαί at 188a19-30?

This passage divides into two parts. At a19-27 Aristotle invokes the views of some of his predecessors, and at a27-30 he gives an account of why their view that opposites are principles is

reasonable.

Now everyone makes the opposites principles—those who say that the universe is one and unchanging (for even Parmenides makes hot and cold principles, and these he calls fire and earth), or that the principles are rare and dense, or Democritus <who says that they are> the full and empty, of which he says that the one is as what is and the other is as what is not. Further <he says that things differ> by position, shape, arrangement: these are genera of opposites—of position they are above and below, in front and behind; of shape angled and unangular,¹⁵ straight and curved. That everyone in a way makes the principles opposites is, therefore, clear. (188a19-27)

This is, on the face of it, somewhat unexpected: though there has been some talk of opposites, of course, what has preceded in ch. 4 focused at least as much on his predecessors' treatment of 'the underlying thing', and what follows refers only to the Eleatics, the unnamed proponents of the rare and the dense, and the atomists—hardly a complete list. The best explanation is probably that Aristotle, having first deployed a classification in terms of the *number* of principles his predecessors recognised, is here introducing a fresh way of thinking about their view of principles.¹⁶ The incompleteness of his list presumably reflects the fact that he takes other predecessors' appeals to opposites to be obvious.

I am not going to discuss the accuracy of Aristotle's claims about the Presocratics, but I will say something about Aristotle's account of Democritus, and draw a consequence for his account of his other predecessors as well. It does not seem unreasonable to say that Democritus' principles include the full and the empty, and—with a stretch—perhaps the angled and unangular, and the straight and curved as well. It is plain, however, that—despite what Aristotle is going on to say about opposites at 188a30-b26—these principles are *not*, in Democritus' system, the termini of change: nothing in his system changes from full to empty, or from angled to unangular.¹⁷ In what sense, then, are they principles? It seems that Aristotle is treating his predecessors' appeals to opposites as systems or schemata of fundamental physical explanation, in which the opposites figure as the terms in which ultimate physical explanations are to be given. One such schema might take the form:

X comes to be *F* because of the movements of the full in the empty.

But then there seems no reason to rule out explanations which do *not* involve change, and hence schemata of the form:

X is *G* because of the angularity of its atoms.¹⁸

By the same token, Aristotle may be thinking that, for Anaximenes, at least some ultimate physical explanations take the form:

X is *F* (or even: there is an *F* here) because *X* is (here there is) air, of such-and-such density.

The upshot of this is that the common ground with his predecessors to which Aristotle is appealing is about fundamental explanations in natural science generally, and not exclusively about the explanation of natural *changes*. This brings into sharp relief an issue we would face in any case. In chapter 1 Aristotle says that the causes and principles that he is concerned with are those we need for the science of, or knowledge of, φύσις.¹⁹ Aristotle makes the meaning of this entirely clear in ch. 7: they are ‘the causes and principles of the things that are by nature’.²⁰ The principles Aristotle seeks in *Phys.* I are thus not the principles of *change*, as some commentators have held,²¹ but the principles of the things which are by nature – and so, principally, of natural substances. One of the principal questions for *Physics* I as a whole is why Aristotle tries to arrive at these principles by investigating *change*. I shall discuss this in section 4.

3. The tension between the claims that ἐναντία are and are not from each other

And this is reasonable [εὐλόγως]: for the principles must be neither from each other nor from other things, and all things must be from them. These things belong to the primary opposites—on the one hand because primary things are not from other things, and on the other because opposites are not from each other. (188a27-30)

The argument appears to be this:

(1) The principles must not be from each other; and they must not be from other things—

the assumption in both cases is that if X is from Y , X cannot be a principle.

(2) All (other) things must be from the principles—the assumption is that principles must be the principles *of* all other things in some way.

Supply: (3) Other things *are* from the primary opposites: clearly Aristotle thinks that he and/or his predecessors are committed to this.

(4) Primary opposites are *not* from other things because they are primary.

(5) Primary opposites are not from each other because opposites are not from each other: it is hard to assess this without investigating the meaning of ἐκ: see below.

Two comments are in order before I turn to the main issue I wish to discuss. The first concerns premise (3). Aristotle neither needs to maintain, nor would be justified in maintaining, that *all* other things come from the primary opposites—unless he wishes to conclude that the *only* principles are these opposites. His premises here are entirely consistent with the claim that there are *other* principles, which do not come from anything. Nor would he appear to be justified were he to hold that his predecessors, at any rate, held the stronger view of (3), given what he has said in ch. 4 about their appeal to the underlying thing. The second concerns premise (4). This might show that the primary opposites are not from other opposites; but the argument does not exclude the possibility that there might be primary things which are not opposites and that the primary opposites are from these. Both of these points are relevant to the arguments of chs 6 and 7.

The key problem here is that Aristotle appears to insist both that opposites are not from (ἐκ) each other (a27-30) *and* that they come to be from each other (a30-b26). One way to disarm this apparent contradiction would be to suppose that Aristotle is not arguing in his own person at a27-30, and that his claim is only that his predecessors' position is reasonable *from their point of view*. εὐλόγως and εὐλογον in Aristotle's discussions of nature are positive, if more or less cautious, terms: they need not indicate a lack of confidence in the truth of what is in question,²² though they can certainly indicate that the grounds being offered are not conclusive.²³ Cases in which these terms introduce something which Aristotle takes to be reasonable in a purely *ad hominem* way are hard to find: the closest one is perhaps GC I.2.315b30-33:

This latter doctrine, as we have explained elsewhere, is in itself unreasonable—to halt the analysis at planes. Thus it is more reasonable to hold that what are indivisible are bodies, but a great many unreasonable consequences are involved here too.²⁴

Phys. III.4.203b4-15 might be more to the point: it introduces a line of thought which makes it reasonable to take the infinite to be a principle, and so it ‘justifies’ an *endoxon* which Aristotle himself firmly rejects.

There are two problems with reading our passage in this sort of way, however. First, Aristotle is citing his predecessors in support of his own view: this would be problematic if their view were based on a claim which Aristotle rejects outright. Second, his account of Democritus (and perhaps the other Presocratics, too) itself presupposes a sense of ‘are from’ given which he ought to accept something like the line of thought in a27-30 (see below).²⁵

If Aristotle is endorsing, or at least not rejecting, the premises of the argument, then there are, in principle, at least two ways of dealing with the problem: we might suppose that the claims invoke opposites in two different ways—e.g. by referring to opposite properties, on the one hand, and to subjects qualified by those properties on the other—or that Aristotle is using ‘from’ in ‘are from’ and ‘come from’ in two different senses. The famous discussion of opposites in the *Phaedo*,²⁶ which no doubt Aristotle has in mind here, might suggest the first of these. Socrates says (A) that every opposite necessarily comes to be from its opposite, and (B) that opposites do not come to be their opposite.²⁷ An unnamed interlocutor says that (B) ‘is the very opposite’²⁸ of (A): Socrates resolves the problem by explaining that (A) was a claim about ‘the thing that is opposite’,²⁹ whereas (B) is about ‘the opposite itself’.³⁰ Is Socrates’ resolution Aristotle’s too? The first thing to notice is that in affirming (B) Socrates does not actually say that opposites do not *come from* their opposites: he says that they are not willing to *come to be* the other opposite, but rather withdraw or perish at its approach (102d5-103a2); nor does the unnamed interlocutor rephrase (B) in this direction. So Socrates’ problem is not obviously the same as Aristotle’s problem. Might the solution nonetheless be the same? It is striking that (as we shall see in section 4) Aristotle shows little or no interest in making clear the ontological status of the opposites as they appear in either of the ‘ἐκ’ claims, and this alone might be enough to entitle us to suppose that he is not mirroring the *Phaedo*. Let us suppose, however, that this is his solution nonetheless. The claims would be that a pair of opposites (say, *F* and *G*) are themselves not from each other, whereas a thing which is *F* comes from something which is *G*: these are at least something like

the claims that *F itself* (perhaps the property *F*) does not become *G*, but things which are *F* do become *G*. While this would be compatible with claim (1) of the argument at a27-30—that principles are not from each other—it would make a nonsense of claim (2), that things which are not principles are from the principles. So while the ontological status of ‘the *F*’ may be an important issue in its own right, I think the most promising solution to our problem is to suppose that Aristotle is using ‘are from’ and ‘come to be from’ in two different senses. This will involve a sense of ἐκ in which opposites plainly are not from each other—but at the same time other things are from them—and another sense in which opposites do come from each other. As with his account of Democritus, discussed earlier, this again is hard to square with the idea that Aristotle is all along talking about the principles of *change* or about opposites solely as the termini of changes.

Aristotle’s account of the senses of ἐκ in *Metaph.* V.24 is the natural place to look; but this account is not altogether helpful, and is in any case far from perspicuous. He distinguishes the following ways in which something can be said to be that from which something is:

- (i) as matter (in some sense: but does Aristotle mean the matter that now underlies the thing, or the preceding item from which it came to be?)
- (ii) as efficient cause
- (iii) as a whole which a part is from
- (iv) as the part a form is from
- (v) as a thing something is from a part of
- (vi) as what precedes something in time, whether merely preceding it or being replaced by it.

Of these, only (i) and possibly (vi) seem relevant; strikingly, one sense that seems lacking is the sense in which a thing is from its components—the converse, as it were, of (iii)—indeed, one type of case of this (but not the only one) is mentioned in Aristotle’s formulation of (iii): ‘what is composed from matter and form’.³¹ Perhaps Aristotle intends this to be covered by (i), but if so this is hardly clear. In any case, the compositional sense seems a plausible one to see deployed at a27-30: opposites are not composed of each other, while principles (sc. in the relevant sense) are what other things are composed of. Now ‘composed of’ is not itself a transparent notion. We might distinguish—at least—the following:

- (A) X is composed of Y, Z, \dots iff Y, Z, \dots are its non-overlapping proper physical parts
- (B) X is composed of Y, Z, \dots iff Y, Z, \dots are its metaphysical parts (e.g. its form and matter)
- (C) X is composed of Y, Z, \dots iff Y, Z, \dots are the matter for its physical parts
- (D) X is composed of Y, Z, \dots iff Y, Z, \dots are the features of its physical (or metaphysical) parts, or of the matter of its physical parts, which differentiate X from other things
- (D*) X is composed of Y, Z, \dots iff Y, Z, \dots are the terms in which the features of its physical (or metaphysical) parts, or of the matter of its physical parts, which differentiate X from other things, are essentially characterised.

With (D) and (D*) we come close to the thought that seems to lie behind Aristotle's treatment of Democritus—or indeed of those who make the underlying thing (say) air, and for whom the principles are the rare and the dense.³² On these readings, at least, the claims that opposites are not composed of each other, that principles are not composed of other things and that other things are composed of principles seem quite plausible. With this usage—and this idea—we may compare *Metaph.* X.7.1057b22–3: 'the opposites are not composed of each other, and so are principles.'³³ The sense of 'come to be ἐκ' in play at a30-b26 will indeed turn out to be different from this 'compositional' sense.³⁴ There is, of course, a further question which arises in ch. 6—whether when Aristotle implies there that a substance 'is not from' non-substances (πῶς οὐν ἐκ μὴ οὐσιῶν οὐσία ἂν εἴη; (189a33)), he is using 'is ἐκ' in the same sense as the sense identified here.³⁵ It is not obvious that substances cannot be from non-substances in sense (D) or sense (D*)—whereas it might be closer to being obvious if we were talking about sense (B).

If this passage is concerned with composition and not with the termini of change, what is the connection between the enquiry into principles and the investigation of changes? As I said above (p. 5), this is one of the central questions for *Phys.* I as a whole. One possibility, quite in line with the general approach of ch. 5, is that Aristotle thinks that if all changes are between opposites, any natural substance must be stocked, as it were, with (members of pairs of) opposites: any feature a substance had which is not an opposite, or which is not suitably underpinned by opposites in the way exemplified by the σύνθετα at b8ff.,³⁶ would be a feature in respect of which it simply could not change. This line of thought does not obviously get us to the *principles* of natural things, however. My own view is that in *Phys.* I Aristotle gives us only a partial glimpse of his overall strategy—as, indeed, he only gives us a glimpse of the notions of matter and substantial form.³⁷ While there simply is no deducing the principles of natural things from a general analysis of changes, what Aristotle will do elsewhere is to develop an

understanding of matter as what underlies substantial generation and destruction, of what form must be like in these cases, and of the roles of potentiality and actuality, in such a way as to make it very plausible that the principles of natural substances are indeed the fundamental items involved in change, namely matter and form.³⁸

4. The logical grammar and/or the ontological commitments of Aristotle's claims about ἐναντία at 188a30-b26

We must, however, investigate how this turns out on the basis of general considerations. (188a30-31)

We should probably associate the phrase ἐπὶ τοῦ λόγου—‘on the basis of general considerations’—with the more familiar notion of arguments which proceed λογικῶς.³⁹ Aristotle frequently contrasts such arguments with those which proceed in some other way. In the *De Caelo* the contrast is between relatively general arguments and ones which proceed φυσικῶς—that is, which appeal to specific properties of the cosmos and/or of the natural bodies concerned. In *Metaph.* VII the other side of the contrast is left implicit: what seems to be involved is the idea of being more neutral or less neutral between competing metaphysical views.⁴⁰ ἐπὶ τοῦ λόγου itself is also used at *Phys.* VIII.8.262a18-19 and *GA* II.4.740a4-5, where the contrast is between basing a conclusion on observation and basing it on a more general argument. The appeal to his predecessors' views *is* an argument, Aristotle thinks; but now he gives a more general one. Some commentators take the claim that the schema set out at 188a36-b26 applies to all cases of change to be meant as a simple conceptual truth reflecting the very nature of change: there is just no *change* if *S* comes to be *A* and *A* is not an opposite/intermediate or if *S* (or something appropriately related to *S*) did not possess *A*'s opposite/intermediate earlier.⁴¹ Aristotle does not appear to endorse the claim understood this way (which would commit him to thinking that something's coming to be a house is not a *real* change, and that the real change is something coming to be house-structured), as his treatment of the cases of the house and the statue seems to show. He is right not to endorse the claim, as it is simply false: it is enough, at this conceptual level, for a real change that *S* or its appropriately related predecessor failed to be *A*.⁴² Given this, and the context of Aristotle's discussion, it seems better to suppose he intends it as a deeper scientific truth, applying (as we shall see) either to changes or to underlying changes as

appropriate: general reflection on these cases reveals an articulated explanatory pattern which his predecessors did not (or did not properly) discern.⁴³

Before turning to the claims at a31ff., we should ask what the contrast is between simples (*ἀπλᾶ*) and composites (*σύνθετα*) at b8-10:

And this holds in the same way in the other cases, since the same account holds also for those of the things that are which are not simple but composite. (188b8-10)

We might expect the composites to be things composed of simples—so that the composites would be composed of a plurality of opposites. Aristotle does not always use ‘composite’ in this way, however.⁴⁴ More importantly, if the composites here were thought of in this way their coming to be ought to be analysed in terms of the joint coming to be of their component opposites; but it is in fact analysed in terms of distinct and apparently unitary opposites.⁴⁵ So I suggest that composites here are composites in a more general sense, namely things whose coming to be is a matter of the combining or arranging of a number of things or parts, and that the ‘simples’ are just items which are not composites in this sense.⁴⁶

Aristotle’s principal claim in this passage appears to be ‘of all the things that are nothing is of a nature to do or to undergo just anything under the agency of just anything; nor does anything whatever come to be from anything whatever.’ It is the latter claim on which he expands at some length; as we shall see (pp. 13-14), this will in turn justify the former claim. This elaboration takes the form of a series of examples which plainly stands for, or encourages us to envisage, a schema which is supposed to apply to all cases of change. The claim ‘nor does anything whatever come to be from anything whatever’ is grounded in the claim that the values for *X* and *Z* in the schema must invoke opposites, and the values for *W* must invoke intermediates between opposites (in cases where there are such intermediates):⁴⁷

ἀπλᾶ	X comes to be	not from just any Y	but rather from Z	or from W (if any)
	λευκόν μουσικόν	οὐ λευκοῦ οὐ μουσικοῦ	μέλανος ἁμούσου	τῶν μεταξύ
	X ceases to be	not into just any Y	but rather into Z	or into W (if any)
	τὸ λευκόν τὸ μουσικόν	τὸ μὴ λευκόν τὸ μὴ μουσικόν	τὸ μέλαν τὸ ἄμουσον	τὸ μεταξύ
σύνθετα	X comes to be	not from just any Y	but rather from Z	
	τὸ ἡρμωσμένον τὸ ἀνάρμωστον οἰκία ὁ ἀνδριάς καὶ τῶν ἐσχηματισμένων τι		ἀναρμόστου ἡρμωσμένου ἐκ τοῦ μὴ συγκεῖσθαι ἀλλὰ διηρῆσθαι ταδί ὠδί ἀσχημοσύνης	
	X ceases to be	not into just any Y	but rather into Z	
	τὸ ἡρμωσμένον		not just any ἀναρμωστίαν, but τὴν ἀντικειμένην	

This passage raises a number of questions.

(i) The meaning of ‘come to be from’. Aristotle makes it clear that this is to be understood as parallel to ‘cease to be into’. The suitability of *both* expressions already tells us that ‘from’ here does not have a compositional sense, and the parallel with ceasing to be into makes it clear that

what is involved is temporal succession. We met a sense of ἐκ like this in *Metaph.* V.24 (sense (vi)): there Aristotle distinguishes what we might call *mere* temporal succession from succession which involves *replacement*: it will turn out that he needs a yet stronger sense here, in which the replaced and replacing items are identical or related in some special way. I shall return to this point.

(ii) The ontological status of the values for X , Y , Z , and W —and hence the nature of the ‘invoke’ relation. As is clear from the table above, Aristotle uses an almost perversely varied set of expressions for the values for X , Y , Z , and W : neuter singular adjectives without an article, neuter singular adjectives with a definite article, abstract nouns—and for good measure concrete nouns as well. Expressions such as τὸ λευκόν could refer to the property *being pale*, or to a thing which has the property—the pale thing. The use of abstract nouns such as ἄσχημοσύνης (and perhaps the use of the adjective without an article) might lead us to suppose that the former usage is in view, as might the phrase τὰς ἀντικειμένας διαθέσεις at b10-11;⁴⁸ but the latter usage is suggested by the expression τοῦ μὴ συγκεῖσθαι ἀλλὰ διηρηῆσθαι ταδί ὡδί at b18-19,⁴⁹ and by Aristotle’s glossing ἀνδριάς as an example of τῶν ἐσχηματισμένων. Bogen points to the expression πλὴν εἰ μὴ συμβεβηκὸς εἶη τῷ μὴ λευκῷ ἢ τῷ μέλανι τὸ μουσικόν at a35-6, and argues that ‘[t]he dative construction of the expression ... τῷ μὴ λευκῷ makes it look as though the expression ‘the musical’ must refer (not to a subject which is musical, but rather) to something ... which can be in a subject.’⁵⁰ This argument seems a two-edged sword, however, since if it were right the subsequent expressions τῷ μὴ λευκῷ and τῷ μέλανι would have to refer to a *subject* which is not-pale or dark. In any case, I prefer to understand συμβεβηκός as used as a nominal rather than an adverbial expression, and to translate this as ‘unless the educated were an incidental to the not pale or the dark’, which carries neither implication.⁵¹

However we are to construe the values of X , Y , Z , and W , it seems plausible that Aristotle must take the ultimate truth-makers of these claims to be something’s coming to be F from something’s being G (where F and G are placeholders for opposites or intermediate properties). Suppose that this passage envisaged the weaker condition that:

(C1) If F (ness) comes to be at t_2 , then there was G (ness) at t_1 ⁵²

As we saw, Aristotle’s principal claim in this passage as a whole is ‘of all the things that are

nothing is of a nature to do or to undergo just anything under the agency of just anything; nor does anything whatever come to be from anything whatever.’ Although statements of the form of (C1) may state a necessary condition for this claim, it is hard to see how they could establish either of its parts. If the requirement for x coming to be F is simply that there was G (ness) earlier, then it would seem that there are no constraints on what x must be like earlier, and hence that anything might come to be from anything whatever, and equally that an agent could cause something to undergo anything—it would only be that nothing could come from anything *in any circumstances whatever*. Indeed, for the same reason, even the condition

(C2) $\forall x$ if x comes to be F at t_2 , then $\exists y$ y was G at t_1

is too weak: we need one or other of:

(C3) $\forall x$ if x comes to be F at t_2 , then $\exists y$ Rxy and y was G at t_1

(C4) $\forall x$ if x comes to be F at t_2 , then x was G at t_1

where R is some relation which would distinguish cases of genuine change between opposites from other cases for which only (C2) might be true; this relation might be disjunctive, with one disjunct being identity. The question whether Aristotle has (C3) or (C4) in mind is of course the question whether he thinks that the subject of a change persists through every case of change—and that is raised, if at all, only later in Book I. If the ultimate truth-makers of the claims encapsulated in the schema are of the form of either (C3) or (C4), we can see how Aristotle supposes his principal claim to be justified. Nothing can come to be F without it or something appropriately related to it being G earlier; and so nothing comes to be from just anything whatever; nor will just any agency suffice, for it must be one which can act on what was G so as to make it or its appropriately related successor F .⁵³

(iii) What is the distinction between the permissible values for Y ($\sigma\upsilon\kappa$ - F) and those for Z (privative- α - F)? Despite my critical comments on the use of the term ‘contraries’ for what is invoked by the intended values for X and Z , I think that it is quite reasonable to think of what is invoked by the values for Y in terms of *contradictories*: Aristotle regularly treats being not- F as a matter of simply failing to be F .⁵⁴ One way of X ’s failing to be F , for Aristotle, is for X not to exist;⁵⁵ another is for X not to be the sort of thing which can be F . So one might think that the

contrast between privative- α - F and $\text{οὐκ-}F$ is primarily that between things which fail to be F but which are capable of being F and things which are simply not capable of being F . This does not, however, capture the whole of Aristotle's notion of ἐναντίον , since one other element in this idea, as we have seen, is that of maximum difference within a genus—this is, for instance, why intermediates are not simply further ἐναντία —and more generally, there is his insistence that each ἐναντίον only has one opposite. Another element in the idea is that Aristotle often regards *both* opposites as being or involving causal powers.⁵⁶ Even when he characterises contraries in terms of ἕξις and privation in *Metaph. X*,⁵⁷ he says that intermediates are 'composed of' the two contraries:⁵⁸ this difficult idea only begins to make sense if we think of the intermediates as a blend of two causally efficacious ingredients, rather than as a blend of a form and its absence. On the other hand, later in *Phys. I* Aristotle seems willing to treat privation as simply the absence of the form: see 7.191a5-7 and 9.192a3-5.⁵⁹

(iii) The οἰκία/ἀνδριάς cases introduce two new points. First, Aristotle introduces (admittedly only by implication) the idea that the claim that change is between opposites may in some cases only apply to *underlying changes*: Aristotle is not saying that οἰκία has an opposite, nor that there is anything scientifically improper or misleading about saying that something comes to be a house or that a house comes to be. Rather he seems to think that such apparently opposite-less changes occur in virtue of some underlying change which is between opposites.⁶⁰ Second, Aristotle applies the locution 'not just any ... but the ...', which served to pick out the opposite from other kinds of 'contradictory' to the (alleged) opposite itself:

For it is necessary for everything structured to come to be from unstructured, and the unstructured from structured, and for the structured to cease to be into unstructuredness—and this is not just any unstructuredness but the opposed one (188b12-15).

Presumably this is based on the recognition that a set of building materials perfectly capable of, and suitable for, being built into a house can instantiate many conditions which are instances of lacking house-structure but which are structurally and causally distinct from each other and which cannot be regarded as intermediates on a single spectrum: it could be structured so as to form a temple, a council-chamber, a bridge, etc. None of these conditions is the mere 'contradictory' property of failing to be structured as a house. Aristotle now seems tempted by

the idea that ‘maximum difference’ should nonetheless come into play to single out one of these conditions as the furthest from being structured as a house. He betrays some awareness of the shift which has occurred by replacing ἐναντίον by ἀντικείμενην—though, as we saw in section 1, his ultimate conclusion will be expressed in terms of ἐναντία once again. But in any case what could this maximally different condition be? Perhaps the obvious—the only?—candidate would be the materials lacking *any* structure: their being just a heap. If so, however, these cases will lose another feature of standard opposites as Aristotle characterises them, namely that each opposite has only one opposite: for this same lacking of *any* structure would be maximally different from every condition of being structured as a house, bridge, temple, etc.

One of the most puzzling features of *Phys.* I—and equally of its reprise in *Metaph.* XII.1-2 1069b3-14—is Aristotle’s insistence on retaining the term ἐναντία for the termini of change; even though, as we have seen, he occasionally reaches for the more appropriate term ἀντικείμενα, he nonetheless reverts to ἐναντία; and in the *Metaph.* XII passage he goes out of his way to say that ἀντικείμενα is too general a term, and that ἐναντία is the precise one.⁶¹ We might have expected Aristotle to say ‘the Presocratics and Plato were right, up to a point, to offer fundamental explanations of natural changes and other natural things in terms of items which are ἐναντία, such as the hot and the cold. What they failed to see was, first, that these explanations are too specific, and that there is a general pattern to which the termini of all change, and indeed all scientific explanations of natural substances, conform; and, second, that the most general form of this pattern is not ἐναντίον/ἐναντίον, but form/formless; and the variety of cases are held together by analogy.’ I have no good explanation for why he does not say this: the best that I can suggest is this. Perhaps Aristotle finds the appeal to opposites at the fundamental level in the natural philosophy of his predecessors (as he understands them) to be *so* pervasive that he cannot bring himself to suppose that this appeal is utterly wrong: he would rather make (or try to make) his own distinction of form and the formless conform to this universal pattern than to suppose that what everyone thinks is simply false.

5. Assessment of Aristotle’s position in 188a30-b26

Aristotle’s focus on opposites creates severe problems for his claim that his schema applies to all cases of change.

(i) Things can come to be dark from being colourless as well as from being pale,⁶² and similarly bitter from being flavourless, etc. The same applies, of course, to ceasing to be. This suggests that, if the idea is that things come to be *F* only if they have an ability or potentiality to be *F*, this potentiality should if anything be associated with the thing's particular way of lacking *F* (or, in this sense, its privation of *F*), and not with its possession of the opposite of *F*.⁶³

(ii) Aristotle's claim at *Phys.* V.2.226a23-32 that 'in each of these [change with respect to quality, quantity and place] there is opposition [ἐναντιώσις]' seems to be broadly false for changes in quantity and place.⁶⁴ Such changes do involve passing through intermediate points or stages on a continuum, and Bogen and McGuire claim that this is enough to secure the parallel with qualitative opposites.⁶⁵ But these continua do not, in general, have extremes or end points other than those defined by the nature of particular changes, and hence they neither constitute maximum differences nor come in unique pairings—and occupying one point on one of these continua has, in general, nothing to do with the thing's ability to move to or occupy another point other than providing the merely 'contradictory' property of being somewhere else.⁶⁶ In these cases even the modified view I outlined in the previous paragraph—that the potentiality to be *F* should be associated with the thing's particular way of lacking *F*—seems hard to sustain.

(iii) As we have seen, it is hard to regard form and formlessness, or even form and the 'opposed' formlessness, as opposites. Imagine a heap of 16 cubic bricks: these can be arranged (e.g.) as a 4x4 square, a 2x8 rectangle, or a 1x16 rectangle. Even if we grant that among the various ways of the bricks' lacking an arrangement there is one which is 'set against' being arranged as a square, it is hard to see how this can be distinct from the one set against being arranged as a 2x8 rectangle. But if that is right, these opposites are not uniquely paired with each other; by the same token, the idea of maximal difference within a genus or a single range of change seems to have been lost. These points are related to the fact that the other states of being formed (e.g. the rectangles) are not intermediate states between complete formlessness and being formed as a square.⁶⁷ Parallel considerations would apply to a block of marble and being a statue of a particular form. The idea of maximum difference within a genus is perhaps easier to sustain in the case of the coming to be of natural organisms: one extreme is the formed state of the fully developed adult, and the other (on Aristotle's account) is the 'formless' but nonetheless structured state of the material provided by the mother. Chance mutations aside, the latter is only the starting point for the development of organisms of one kind, and mature organisms of other kinds come to be

from different ‘formless but nonetheless structured’ maternal states.⁶⁸ It has to be said, however, that this neat scheme breaks down in what Aristotle claims to be the corresponding case of ceasing to be. (a) There simply is no single extreme formless but nonetheless structured maximal end-state of ceasing to be a mature adult of a given kind which is unique to each kind of organism. We might try to stipulate that this is the first state in which the organism is dead. Even if we ignore deaths by violence and misadventure, however, bodies at this point will display a great variety of conditions with respect to the characteristic functions of the living organism: some organisms will die while most of these functions were still fully operative, but others will have had (e.g.) hearing, sight or mobility lost or seriously degraded much earlier (or lost limbs or parts of limbs), and hence will be at death ‘further away’ from the state of the mature organism. All that these putative end-states will have in common is ‘being the state of the body of an organism of the kind just after its death’, and for the reason given this does not seem to constitute a ‘maximum’ difference—indeed, it does not seem to constitute a *single* condition at all. (b) Even if there were such a single state for each kind of organism, it manifestly would not be the same condition as that from which the organism came to be—nor would either of these be an intermediate. So the ‘structured’ condition of the mature organism would have two opposites.⁶⁹

(iv) A related point starts from Aristotle’s remark at 188b3: ‘nor, then, does anything cease to be into just anything first.’ As a concession that *subsequently* the thing might decay further, this might seem judicious, at least in the case of composites. Aristotle cannot afford to make this concession, however: if *X* has ceased to be *F* and has become *G*, there is nowhere for it to go, so to speak, but back to *F* (or to some intermediate) again.

Aristotle seems to acknowledge at least some of these difficulties at *Phys.* V.1.224b28-29, where he says that (non-incidental) change is between opposites, intermediates *and contradictories*;⁷⁰ the passage in the following chapter, *Phys.* V.2.226a23-32, cited in (ii) above, is more upbeat: ‘in each of these [change in quality, quantity and place] there is opposition [ἐναντιώσις]’—but even this does not attempt to extend the claim about ‘opposition’ to substantial change.

6. Commentary on 188b26-189a10

188b26-30. What is the sense in which Aristotle’s predecessors ‘suppose things without giving an account’? Presumably it is that they did not engage in the sort of analysis he has given at 188a30-

b26.⁷¹ The phrase ‘as if compelled by the truth itself’ is echoed in *Metaph.* I.3.984 b8-11.⁷² Despite its somewhat patronising tone, the basic idea is that facts can strike someone without their being able to give a general account of them or of why they are the way they are. ‘The things they call principles are the opposites’: see the comments on 189a9-10 below.

188b30-189a1. This passage is echoed in the discussion of primary substances as principles in *Metaph.* XII.1 (1069a25-30):

it was of substance that [our predecessors] sought the principles and elements and causes. Some, our contemporaries, take *universals* to be substances (for the genera are universal, and it is these, rather, that they say are principles and substances—because of their abstract method of inquiry), while earlier thinkers took *particulars* to be substances—for example, fire and earth, but not what is common, body.

The distinction is not exactly the same, however; for in *Phys.* I.5 not only the Platonists (odd and even, the great and the small) but also Empedocles (love and strife) are ranged against the proponents of things more knowable by perception.⁷³ The inclusion of Empedocles is both surprising and unsurprising. It is unsurprising because in *Phys.* I.5 the distinction rests not on the universal/particular contrast but on that between what is knowable in account and what is knowable by perception: love and strife are theoretical entities posited to account for certain patterns detectable in change.⁷⁴ It is surprising because love and strife are neither the components of things nor the termini of changes: they are principles (in Empedocles’ system) in a different way, otherwise altogether ignored in ch. 5—namely as efficient causes.⁷⁵ It could perhaps be that by ‘love’ and ‘strife’ Aristotle here means the states of the cosmos during the periods of complete (domination by) love and strife: these states are (plausibly) the termini of cosmic changes. It would be odd to characterise love and strife understood in this way as ‘the causes of coming to be’, however, unless Aristotle is thinking of these states as the material causes of each other. The phrase ‘causes of coming to be’ (αἰτίας τῆς γενέσεως) at 188b34-5 might even suggest that (despite the reference to *στοιχεῖα* at a28) Aristotle is now thinking of *all* these opposites as efficient causes: but in a recapitulation of the earlier account this would be hard to fathom.

‘They are different, as indeed they seem to most people to be, yet they are the same by analogy.’ The ‘as indeed ...’ remark seems to be a piece of self-congratulation: Aristotle is the one

who has detected the key pattern in the apparently chaotic plurality of earlier accounts of principles. One might have expected Aristotle to go on to say that they are the same because they all posit opposites as principles; but this would not be a case of sameness by analogy: what he means is made a little clearer in the next passage.

189a1-9 ‘For they take them from the same column’ must mean, as Ross says, that each of the pairs of opposites they use can be distinguished as positive and negative—though it is a somewhat odd way of saying that. Thus it might be said that they all (in effect) claim that change is between positive and negative termini; but each claim of this sort (invoking positive and negative) is only the same by analogy with the other claims. It is unclear what Aristotle has in mind by ‘and worse and better’: I suggest he thinks that his ‘primary opposition’ (between form and privation, though he has not said this) comes at the top of the two columns, so they include all the others, and so that the higher up the columns one manages to get (i.e. the more general one’s primary opposites are), the better one’s account.

a9-10: ‘That it is necessary for the principles to be opposites is evident.’ As I remarked earlier, this—like the claim at 188b27-30—is a much stronger claim than the one Aristotle started with, and a much stronger one than his arguments (from his predecessors’ accounts and ἐπὶ τοῦ λόγου) support; and of course it is stronger than the position on opposites as principles which he is going on to develop in subsequent chapters.⁷⁶

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Notes

¹ So, e.g., ‘Wffs (statements) *A* and *B* are contrary if they can’t both be true but may both be false’ (Haack 1978: 244; cf. Lemmon 1965: 69).

² *Int.* 10-14; cf., e.g., Lemmon 1965: 170; Mates 1965: 198.

³ I am grateful to Diana Quarantotto for pressing this point. In what follows I shall remain neutral as to whether the *Categories* sense of ἐναντία is the same as the one developed in *Metaph.* X (for one issue see n. 12).

⁴ Bogen 1991 reaches a similar conclusion by a somewhat different route.

⁵ *Cat.* 10.11b38, *Metaph.* X.7.1057a18-19; cf. 188a36-b8, discussed below.

⁶ Something like this point is recognised in some 19th century logic textbooks in the distinction between contrary terms and contrary propositions: see Keynes 1894: 50 and 87. Note that elsewhere in *Metaph.* X.7 (1057b19-22), and in V.10 (1018a25-31), Aristotle somewhat bafflingly says that some ἐναντία are not in the same genus: see Castelli (forthcoming), *ad loc.*

⁷ See p. 15 and n. 58.

⁸ ‘Opposites’ is usually used to translate the more generic ἀντικείμενα (see *Cat.* 10, *Top.* II.8 and V.6, *Metaph.* V.10, I.4 and 7): this is itself not a very helpful translation in any case, since one class of ἀντικείμενα, correlatives, such as knowledge and the knowable, are not typically opposites of any sort. For ἀντικείμενον the workshop group debated between ‘set against each other’ (which is too ungainly to be ideal) and ‘opposed’ (which has too close a connection with ‘opposites’ to be ideal), and decided to use the latter. In translating ἐναντίον, etc., in Simplicius and Philoponus I shall use ‘*enantion*’, etc., so as to avoid prejudging how they understand the terms.

⁹ With the exception of Parmenides, who uses πάντια at B8.55. I am grateful to Tim Clarke for reminding me of this.

¹⁰ Cf. Bostock 1982: 189, and below p. 15; for a general discussion see Ferguson 1969 and Lloyd 1966.

¹¹ See, e.g., Simplicius *in Phys.* 182.2-5: '[Aristotle] himself, as we shall learn, in saying that the *enantia* are principles, will posit form and privation as the principal *enantiodosis*: these are set against each other not as *enantia* but in some other way'. See also Bostock 1982: 190-1. For Philoponus' partial defence of the view that they are *enantia* see below, pp. 17-18.

¹² The position in *Metaph.* X.4 is more complicated. On the one hand, it apparently accepts the same four species of ἀντικείμενον (ἀντίφασις, στέρησις, ἐναντιότης, τὰ πρὸς τι: 1055a38–b1); on the other hand, it characterises the 'primary ἐναντίωσις' as ἕξις and (complete) privation (see below p. 15).

¹³ Cf. the summing up at the very end of the chapter (189a9-10), discussed below. This usage of ἀντικείμενον is repeated in ch. 7 (190a18 and 26, 190b13; at 190b27 the privation is glossed as 'the opposition' [ἡ ἐναντίωσις]).

¹⁴ Simplicius *in Phys.* 181.30-182.6; Philop. *in Phys.* 117.16-22.

¹⁵ Why does Aristotle not give pairs of opposites for arrangement (τάξις)? Ross is probably right to suppose that he is being illustrative in his treatment rather than comprehensive; but Aristotle does face a problem over the idea that there are ἐναντία of arrangements: see section 5.

¹⁶ I am grateful to Tim Clarke for suggesting this.

¹⁷ Someone might hold an 'atomic' theory according to which the basic entities were not atoms but regions of space which have successive phases of being full and empty—a sort of boolean material field. But this is neither Democritus' view nor how Aristotle understands his view. (Note that some of the opposites cited by Aristotle *can* be termini of Democritean change: an atom can come to be above or behind another.)

¹⁸ Compare Democritus' explanations of how things taste (Theophrastus, *de Sensibus* 66-7 [= DK A135]). On the more general point about the role of principles, compare the complaint Aristotle makes against the atomists at *DC* III.4.303a29-b2 that they do not need (as the atomists suppose they do) an infinite number of elements (στοιχεῖα)

because the shapes of the atomic bodies, by which they differ from one another, are composed of rectilinear and non-rectilinear ‘pyramids’: ‘... it is necessary for there to be principles of the [atomic] shapes, so that whether these are one or two or more, the simple bodies will be of this number.’ This only begins to look like a satisfactory complaint if Aristotle is thinking of the ‘elements’ as fundamental explanatory principles. (Compare also, perhaps, *Metaph.* VIII.2’s remarks about the principles of being (1042b31ff.)

¹⁹ τῆς περὶ φύσεως ἐπιστήμης: 184a10-16.

²⁰ αἰτίαι καὶ ἀρχαὶ τῶν φύσει ὄντων: 190b17-18. We may compare the similar expressions later in ch. 7.191a3-4 (αἰ ἀρχαὶ τῶν περὶ γένεσιν φυσικῶν (Ross thinks that περὶ γένεσιν is unidiomatic and suggests deleting it; this does not affect my point, which in any case focuses on τῶν φυσικῶν), and at II.1.193a9-10 (ἡ φύσις καὶ ἡ οὐσία τῶν φύσει ὄντων). Further confirmation of the point—if it were needed—is proved by the present passage and by the claim discussed in section 3 that things ‘are from’ the principles, in a compositional sense of ‘from’.

²¹ See, e.g., Bostock 1982:179-80; the view goes back to Aquinas’ commentary on the *De Sensu* (Prohemium 29-34): ‘in natural science one proceeds from universals to things which are less universal, as the philosopher teaches in *Physics* I. For this reason he began the teaching of natural science with what is most common to all natural things, namely motion and the principles of motion ...’; the passage is quoted in Falcon 2012: 527).

²² See, e.g., *Phys.* III.7.207b1-5, IV.12.220b24-6, VIII.5.256b13-24, VIII.9.265a27-b16, *GA* I.7.324a9-11, II.3.330b1-7, II.10.338a14-b1, *PA* II.1.647b4-6, *Metaph.* XII.8.1074a24-31; an interesting example is the remark at *GA* I.23.731a24: καὶ ταῦτα πάντα εὐλόγως ἡ φύσις δημιουργεῖ. (Another usage common in the biological works—perhaps not unrelated to this idea—is to introduce a fresh set of considerations to show that something already established might have been expected in any case: see, e.g., *PA* II.2.648b8, II.4.651a12-13, II.6.652a7-8, III.4.666b13-14, *GA* I.1.715b8, II.4.738a16-22.)

²³ See, e.g., *HA* VI.13.567b9-11, *GA* I.1715b13, II.7.747a3-4, *Metaph.* XII.8.1074a16-17. They are also Aristotle’s preferred terms when dealing with cosmological matters when proof and/or direct confirmation are not in the

offing. Instructive examples include *DC* II.2.284b18-24, II.8.290a1-5, IV.4.312a5-8, *GC* II.10.336b25-34, *Meteor.* I.3.341a23-6.

²⁴ τοῦτο μὲν οὖν αὐτό, καθάπερ καὶ ἐν ἄλλοις εἰρήκαμεν, ἄλογον μέχρι ἐπιπέδων διαλυῖσθαι· διὸ μᾶλλον εὐλογον σώματα εἶναι ἀδιαίρετα, ἀλλὰ καὶ ταῦτα πολλὴν ἔχει ἀλογίαν (translation from Williams 1982). *Meteor.* II.2.354b4-10 is, in a way, another case: δόξειε γὰρ ἂν εὐλογον εἶναι, καθάπερ καὶ τῶν ἄλλων στοιχείων κτλ; but there εὐλογον is explicitly within the scope of δόξειε.

²⁵ For these reasons, while Aristotle may take his predecessors' use of 'is from' to be somewhat vague, I think that he must have a determinate usage in mind here which yields a claim which he can (by his lights) reasonably ascribe to his predecessors, and also agree to himself (albeit, perhaps, in a refined or modified way). (If he does accept the line of thought at a27-30, why does it not itself constitute an argument ἐπὶ τοῦ λόγου? Perhaps because Aristotle thinks that one should not begin the enquiry into principles by looking for the constituents of things, but at what makes them able to change. See further pp. 9-10.)

²⁶ 70d7-71a10, 102d5ff.

²⁷ (A) τοῦτο οὖν σκεψώμεθα, ἄρα ἀναγκαῖον ὅσοις ἔστι τι ἐναντίον, μηδαμῶθεν ἄλλοθεν αὐτὸ γίνεσθαι ἢ ἐκ τοῦ αὐτῷ ἐναντίου (70e4-6); (B) οὐδ' ἄλλο οὐδὲν τῶν ἐναντίων, ἔτι ὄν ὅπερ ἦν, ἅμα τοῦναντίον γίνεσθαι τε καὶ εἶναι (102e7-103a1).

²⁸ οὐκ ἐν τοῖς πρόσθεν ἡμῖν λόγοις αὐτὸ τὸ ἐναντίον τῶν νυνὶ λεγομένων ὠμολογεῖτο, ἐκ τοῦ ἐλάττονος τὸ μείζον γίνεσθαι καὶ ἐκ τοῦ μείζονος τὸ ἔλαττον, καὶ ἀτεχνῶς αὕτη εἶναι ἢ γένεσις τοῖς ἐναντίοις, ἐκ τῶν ἐναντίων; (103a5-9)

²⁹ τὸ ἐναντίον πρᾶγμα (103b2-4). Cf. 71b2; more generally, the earlier passage talks in terms of *something coming to be* *F*.

³⁰ αὐτὸ τὸ ἐναντίον (103b4-5). Note that this may not quite be the same as the distinction between a property and the object which has the property, since Socrates will later go on to talk indifferently of fire and threeness as being what brings the opposite to the object which has it. Equally, the notion of the opposite itself is unclear: the talk of its withdrawing and ceasing to be suggests that it is not an abstract item (e.g. a pure universal), nor the particular instantiation of the property in a given object, since its ‘withdrawal’ is distinguished from its ceasing to be.

³¹ ἐκ τοῦ συνθέτου ἐκ τῆς ὕλης καὶ τῆς μορφῆς (1023a31-2). We find ἐκ used in a clearly compositional sense at *GC* I.2 316b4-5 (ἄτοπον ἐκ μὴ μεγεθῶν μέγεθος εἶναι) and *Phys.* IV.10.218a7-8 (συγκεῖσθαι δεῖ τὸ ὅλον ἐκ τῶν μερῶν·ὁ δὲ χρόνος οὐ δοκεῖ συγκεῖσθαι ἐκ τῶν νῦν)—and in relation to the Presocratics’ view at *Metaph.* V.2.1004b29-30: τὰ δ’ ὄντα καὶ τὴν οὐσίαν ὁμολογοῦσιν ἐξ ἐναντίων σχεδὸν ἅπαντες συγκεῖσθαι (Diana Quarantotto drew my attention to this passage).

³² (D) or (D*) also fit Aristotle’s treatment of Parmenides better than (A) or (C): the hot and the cold are more plausibly features of fire and earth than they are the referents of the terms ‘fire’ and ‘earth’.

³³ τὰ μὲν οὖν ἐναντία ἀσύνθετα ἐξ ἀλλήλων, ὥστε ἀρχαί (the contrast there is with the intermediates, which σύγκειται ἐκ τῶν ἐναντίων (1057b33-4): see p. 15 below).

³⁴ This is close to part of Simplicius’ view (*in Phys.* 182.19-30). Like Philoponus (*in Phys.* 111.17-26) he takes it that opposites do not come from each other in the sense that neither opposite can be the (pre-existing and persisting) matter for the other’s coming to be, nor their efficient cause (186.20-21); but he takes the claim that opposites are principles to be true because ‘the coming to be of things which come to be after the principles involves change; and every change, as will be shown, comes about from *enantion* to *enantion*’ (182.28-30). For his reading of the claim that opposites do come from each other (186.15ff.), see section 5 below. (According to Simplicius, Ammonius agreed that Aristotle uses ἐκ in two different senses, but offered a Platonising interpretation of the first sense: principles are not ἐκ other things because they are the highest genera, and hence prior to everything else (183.18-35).)

³⁵ That the senses are the same is taken for granted by Kelsey (2008: 186-8).

³⁶ See section 4.

³⁷ And, one might add, virtually no sight at all of the notion of potentiality.

³⁸ I discuss this further in Judson (forthcoming), Prologue to ch. 2. David Charles argues for a related but distinct position in his essay on I.7.

³⁹ Charlton floats the idea that this means ‘with reference to how we speak’, and cites *Phaedo* 99e4-100a2 in support of this. But λόγους in that passage does not obviously refer to speech or how we speak rather than to arguments or accounts. (ἐπὶ τοῦ λόγου does mean something like this (with the idea of being taken in by how one expresses something) in a number of passages in the *Sophistici Elenchi*.) Note that Charlton misrepresents Ross, who associates ἐπὶ τοῦ λόγου in I.5 with the use of the phrase at *Phys.* VIII.8.262a18-19 mentioned above, and not, as Charlton says, with *GC* I.8.325a14.

⁴⁰ For discussion see Burnyeat 2001, especially 19-25; Lewis 2013: Introduction and ch. 1.

⁴¹ This may be Broadie’s view—or at least her view of Aristotle’s view of the Presocratics. At any rate, she speaks, in the latter connection, of the ‘conceptual advantages in equating X’s coming into being with X’s coming into being from the opposite of X, say A’ (Waterlow 1982: 10). For Kelsey’s view see n. 47. Charlton’s view is that it ‘is not an empirical doctrine to the effect that the universe is regular; it is the purely logical doctrine that change is within definite ranges’ (1970: 66). I am not sure that I understand the force of ‘purely logical’, but in any case, the ‘doctrine’ seems either simply false or too weak to capture Aristotle’s claim about the role of ἐναντία.

⁴² In saying this I am simply bracketing the need for a further condition so as to exclude Cambridge changes: this is a separate issue which arises for both the views of change in question here.

⁴³ An example of this type of interpretation is that of Bogen, who thinks that Aristotle’s claim invokes *abilities to change*: ‘being dark seems to involve more than privation of lightness; to be dark is also to have a predicate which makes a subject able to become light’ (1991: 60; cf. *Simpl. in Phys.* 186.15-187.9). For further discussion see pp. 9-10

above and Charles's essays on I.7. Robert Bolton claims that Aristotle's appeal to different cases of change is a straightforward case of Aristotelian induction or 'empirical reasoning' (1991: 23-6). I think that this seriously underplays both the characterisation of the argument as ἐπὶ τοῦ λόγου (see above), and Aristotle's general argumentative strategy in *Phys.* I: Aristotle thinks that his predecessors have latched onto the truth up to a point, but have not been able to give an account (188b26-30). To use the language of ch. 1, they have not progressed (far) beyond the level of what is compounded (συγκεχυμένα), and what is needed to progress to what is more intelligible by nature is not observation, but rational reflection on what we observe. I am grateful to Alan Code for pressing me on this point.

⁴⁴ So, e.g., the composites of *Metaph.* VII.4, such as (a) pale man, are contrasted not with their components as such, but with genuine unities.

⁴⁵ Or at least things which Aristotle claims here to be opposites: see below.

⁴⁶ Note that this would not prevent these simples from being composites in the VII.4 sense—e.g. (an) educated man. I discuss the ontology of the simples below.

⁴⁷ Cf. b21-6. Kelsey takes quite a different view—that the 'not just anything' claim is the ground for the 'opposites/intermediates' claim. He then identifies a gap between them, which he thinks can be filled only if we suppose that 'Aristotle is operating in *Physics* I.5 with a very specific and (we might say) one-sided conception of change, according to which the action of change upon its subjects is essentially destructive' (2008: 188-90; this quotation p. 190). He detects this conception of change in the idea of opposites 'driving themselves out of their own nature' at *GC* I.7.323b25-9. But if there is a gap, it seems to me simply to recur in the same form in the 'driving out' claim: we might grant that not just anything whatever can drive just anything out, but that falls short in just the same way of the idea that whenever something is driven out it must be a case of an opposite driving an opposite out.

⁴⁸ Cf. Charlton 1970: 70. For Aristotle's account of διαθέσεις as qualities see *Cat.* 8.8b25-9a13.

⁴⁹ *Pace* Charlton 1970: 70.

⁵⁰ 1991: 60. Bogen does not say how he would translate the expression, but I suppose that he must be taking *συμβεβηκός* to be elliptical for *κατὰ συμβεβηκός*, and that he would render it ‘unless the musical is in the not pale or the dark incidentally’.

⁵¹ Compare III.4.203a5 (*οὐχ ὡς συμβεβηκός τιτι ἐτέρῳ ἀλλ’ οὐσίαν*) and II.5.196b35 (*συνέβη αὐτῷ ἐλθεῖν*). Note that the parallel expression for the case of ceasing to be, a few lines later in I.5 (188b4-5), has, on the one hand, *κατὰ συμβεβηκός*, but, on the other hand, no datives. Charlton seems to construe the expression in a similar way to me: ‘unless the knowing music supervenes on the not pale or the dark’. Hardie and Gaye (1930) side with Bogen: ‘unless “musical” happened to be an attribute of the not-white or of the black’.

⁵² For ease of exposition (C1)-(C4) here do not attempt to capture the further key feature of Aristotle’s claims, that whenever *any* change takes place, it is or involves a change between opposites and/or intermediates.

⁵³ Simplicius thinks that Aristotle is basing what I have called his principal claim here on a causal transmission principle—that contraries are needed to *act* to produce their like (*in Phys.* 184.14-186.14). As Simplicius admits at 185.34-6, however, none of the examples in Aristotle’s schema are cases of agency, so this interpretation is very hard to sustain.

⁵⁴ See, e.g., *Int.* 10.

⁵⁵ *Cat.* 10.13b15-33. Aristotle is—apparently—not entirely consistent in this view, since he thinks Homer is a poet (*Int.* 11.21a25-6): cf. Castelli (forthcoming) *ad* 1057a30-b1. For a defence of Aristotle see Mignucci 2007: 125-30.

⁵⁶ Hot and cold are both active: *Meteor.* IV.1.378b10-379a3 (cf. 12.390b2-9), *GC* II.2.329b24-30; dry and moist, though passive, both have causal characteristics: *GC* II.2.329b30-330a12. Cf. Bogen 1991: 60.

⁵⁷ See n. 12 above.

⁵⁸ *Metaph.* X.7.1057b22-34; cf. p. 9 and n. 34 above.

⁵⁹ On the other hand again, see *Phys* II.1.193b18-21.

⁶⁰ Ross (1936: 489) takes a different view. He thinks that Aristotle holds that οἰκία, ἀνδριάς, etc., are (potentially misleading) *names* for those very conditions of being structured which are the opposites of the relevant unstructured condition(s). This is certainly a possible way to understand the remark that ‘this is overlooked because the conditions which are set against them have not been named,’ but it is impossible to square with Aristotle’s standard view that substances have no opposite (*Cat.* 5.3b24-32, *Phys.* I.6.189a27-34)—and indeed with the view that a house is something which possesses or exemplifies a certain structured condition. That said, if we look ahead to the doctrines of *Metaph.* VII and XII (and perhaps even to *Phys.* I.7), Aristotle will not be able to maintain all three of the following: (i) form is a substance; (ii) form is the opposite of privation; (iii) no substance has an opposite. Proposition (ii) is clearly the best one to be dropped. See also section 5.

⁶¹ See, on the other hand, *Phys.* V.1.224b28-29, cited on p. 18 below.

⁶² See Bostock 1982: 190.

⁶³ For what I take to be similar reasons Simplicius tries on Aristotle’s behalf to align the notions of opposites and privations in the passage cited in n. 43 above.

⁶⁴ Indeed in *Cat.* 6 (5b11ff.) Aristotle denies that quantities (or, apparently, places) have ἐναντία. For discussion see Ackrill 1963, *ad loc.*, and Gregoric 2006.

⁶⁵ 2006: 5-6 and n. 6.

⁶⁶ There may of course be limits to growth given by the nature of the subject if it is an organism (a point made by Bogen (1992: 20); but this need not be true for all changes in quantity in such subjects (such as what we call ‘growths’), and is not true for other subjects such as ice-sheets or spits of sand deposited by the sea.

⁶⁷ Cf. Philop. *in Phys.* 113.9-114.16, and Bostock 1982: 190.

⁶⁸ Philoponus makes this point (*in Phys.* 114.16-32; cf. Simpl. *in Phys.* 186.12-14), though he takes the originating state to belong to the combination of the maternal material and the paternal seed.

⁶⁹ Ceasing to be is also problematic for artefacts: one way of destroying (e.g.) a house is by resolving it back into the formless heap of materials from which it came to be; likewise one might melt the bronze of a statue. But a house can also be destroyed by shattering the constituent timbers, bricks, etc.—as a marble statute might also be destroyed. In these types of case, the state into which the thing ceases to be is not the same as the state from which it came to be. See also point (iv).

⁷⁰ ἐν ἀντιφάσει; cf. κατ' ἀντίφασιν at 225a12-14.

⁷¹ See n. 43.

⁷² Cf. 984a17-19, where it is τὸ πρᾶγμα, rather than ἡ ἀλήθεια, which is said to have done the compelling.

⁷³ Other passages in which Aristotle draws related but not obviously identical distinctions include *Phys* I.1, III.4.203a3-18, *Metaph.* X.2.1053b9-16 (I am grateful to Laura Castelli for drawing my attention to the latter two passages).

⁷⁴ Another, related difference is revealed at 189a1-9, where it appears that 'more universal' is unqualifiedly better than 'less universal'—but where this does not mean that 'more Platonic' is better than 'less Platonic', but rather that the more Aristotelian the better! See the comments *ad loc.*

⁷⁵ Cf. *Metaph.* I.4.

⁷⁶ I am grateful to the participants in the workshop for very helpful discussions, and especially to Laura Castelli, David Charles, Tim Clarke, Alan Code, and Diana Quarantotto.